

No. 4,938,569 to Tsunoda, et al. (hereinafter, "Tsunoda"). Applicant respectfully traverses all rejections for at least the reasons set forth below.

Claims 1 and 5, each recite a multi-domain alignment active-matrix liquid crystal display device comprising, *inter alia*, at least one columnar spacer having a diameter varying along its axis provided between two opposing plates. The Office Action avers that Yamada teaches spacers (132, 135, Fig. 19B) that exhibit step-wise variation in diameter and slope along their axis. Such a reading of Yamada is untenable. Fig. 19A illustrates a plan view of the same embodiment shown in cross-section at Fig. 19B. In the plan view it is clear that portion 132 forms a lattice that surrounds and defines the pixel area, and is therefore not columnar in any sense of the word. The only columnar spacers taught by Yamada are spacers 135, which clearly do not vary in diameter. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983).

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *See, In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Applicant respectfully submits that Yamada neither teaches nor suggests spacers which vary in diameter along their axis. Therefore, Applicant respectfully submits that Claims 1 and 5 are patentably distinguished over the prior art. Claims 2-4, 15 and 6-14, 16 depend directly or indirectly from Claims 1 and 5, respectively. These claims are each separately patentable, and are submitted as patentable for at least the same reasons as Claims 1 and 5 from which they depend. Favorable reconsideration and withdrawal of the rejection is kindly requested.

Regarding Claim 7, Tsunoda is offered for its teaching of an orientation layer formed by the oblique vapor deposition of SiO. However, Tsunoda offers no teaching or suggestion to ameliorate the deficiencies of Yamada relative to Claim 5 as illustrated, *supra*. Therefore, Applicant respectfully submits that Claim 7 is further distinguished over both Yamada and/or Tsunoda, either alone or in combination. Favorable reconsideration and withdrawal of the rejection is kindly requested.

As amended, Claims 18 and 25 recite a multi-domain alignment active-matrix liquid crystal display device comprising, *inter alia*, --at least one columnar spacer at a center of a pixel--, which supercedes the original language which read "at a center of an orientation layer on a pixel". This amendment finds support throughout the specification generally, and specifically in the figures, among other places. No new matter has been added.

In the most recent Office Action, the Examiner stated that Claims 18 and 25 read on Yamada because the claims did not recite the spacer placed at a center of the pixel electrode, rather than a center of the alignment layer. As shown in Figs.12B, 19B, 22B and 25B of Yamada, all spacers are clearly located at a periphery of the pixel orientation layer, not at a center, as recited in the claims. Yamada neither teaches nor suggests a spacer disposed approximately at a center of a pixel. Applicant respectfully submits that this rejection has been obviated by the above amendment. *See, Royka, supra*. Claims 19-22 and 24, 26-33 depend either directly or indirectly from Claims 18 and 25, respectively. These claims are each separately patentable, and are submitted as patentable for at least the same reasons as Claims 18 and 25 from which they depend. Favorable reconsideration and withdrawal of the rejection is kindly requested.

Claim 34, recites a multi-domain alignment active-matrix liquid crystal display device comprising, *inter alia*, at least one columnar spacer having a side surface that is slanted or inclined. The Office Action avers that the orientation layer 134b as disposed over the merely cylindrical spacers 135, forms an inclined surface and therefore meets the claim. It is well established that "claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their 'broadest reasonable interpretation.' " *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir., 1983) (emphasis in original) (Quoting *In re Okuzawa*, 537 F.2d 545, 548, 190 USPQ 464, 466 (CCPA 1976)).

By its plain language, the claim recites a spacer having a side surface that is sloped or inclined. The claim does not recite merely a sloped or inclined surface. The instant specification teaches the advantages of a spacer having a sloped or inclined side surface. Those advantages accrue to the invention even when the spacer is placed on top of, rather than beneath, the orientation layer (see Claim 42, discussed *infra*). Therefore, it is unreasonable, in light of the specification, to consider that a spacer having a side surface that is slanted or inclined comprehends within its scope a parallel walled, cylindrical spacer, 135, as disclosed in Yamada (135). That recited feature is neither taught nor suggested by Yamada. Therefore, the claimed invention is patentably distinguished over Yamada.

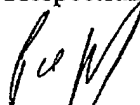
Further, the spacer recited in claims does not require the addition of the orientation layer to form a sloped or inclined side surface to accrue the benefits thereof. It has been held by the courts that omission of an element and the retention of its function are indicia of non-obviousness. *In re Edge*, 359 F.2d 896, 149 USPQ 556 (CCPA 1966)

Claims 35-41 depend directly or indirectly from Claim 34. These claims are each separately patentable, and are submitted as patentable for at least the same reasons as Claim 34 from which they depend. Favorable reconsideration and withdrawal of the rejection is kindly requested.

With respect to Claim 42, this claims recites a multi-domain alignment active-matrix liquid crystal display device comprising, *inter alia*, at least one columnar spacer is provided on said orientation layer. This feature is not recited in any of the previous claims, and is not addressed in the Office Action. In contrast to the claimed invention, Yamada, for example, teaches in Figs.12A, 18, 19A, 22A and 25A, and their accompanying description, that the prior art orientation layer is disposed over the columnar spacers. This is the opposite of the claimed configuration. Therefore, Applicant respectfully submits that Claim 42 is patentably distinguished over Yamada.

In light of the foregoing, Applicant respectfully submits that all claims define patentable subject matter, and kindly solicits and early indication of allowability. If the Examiner has any reservation in allowing the claims, and believes that a telephone interview would advance prosecution, he is kindly requested to telephone the undersigned at his earliest convenience.

Respectfully Submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend Claims 18 and 25 to read as follows:

18. (Twice Amended) A multi-domain alignment active-matrix liquid crystal display device comprising;

first and second transparent plates arranged to oppose each other;

a liquid crystal being sandwiched between the first and second plates, and

pixel electrodes disposed on one of said plates and

counterelectrodes disposed on the other of said plates and adapted to apply voltage to the liquid crystal across the pixel electrodes and the counterelectrodes;

wherein an orientation layer is provided on each pixel electrode of one of said plates via an insulating film,

wherein said orientation layer is formed into a curved or slanted surface so as to orient molecules of the liquid crystal in a direction normal to the curved or slanted surface of said orientation layer, and

wherein at least one columnar spacer is provided between the two opposing plates for regulating a panel gap between said plates, said at least one columnar spacer disposed approximately at a center of said ~~orientation layer on a pixel.~~

25. (Twice Amended) A multi-domain alignment active-matrix liquid crystal display device comprising;

first and second transparent plates arranged to oppose each other;

a liquid crystal being sandwiched between the first and second plates, and pixel electrodes disposed on one of said plates and counterelectrodes disposed on the other of said plates and adapted to apply voltage to the liquid crystal across the pixel electrode and the counterelectrodes;

wherein an orientation layer is provided on each pixel electrode of one of said plates,

wherein said orientation layer and said pixel electrode are formed into a curved or slanted surface;

wherein at least one columnar spacer having a diameter that varies along its axis is provided between the two opposing plates for regulating a panel gap between said plates, and said at least one columnar spacer disposed approximately at a center of said orientation layer on a pixel.